

Amendments to the Claims

This Listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-20 (canceled)

Claim 21. (currently amended) A method of operating a pressurized water reactor having a containment structure containing an integral reactor comprising at least one steam generator mounted together with a reactor core in a pool of reactor coolant in a reactor pressure vessel and with the at least one steam generator having a secondary loop extending outside of the containment structure, the method comprising:

in response to a loss coolant accident resulting in a mass flow of reactor coolant out of the reactor pressure vessel into the containment structure, circulating cooling fluid through the secondary circuit of the at least one steam generator to withdraw heat from the reactor pressure vessel and thereby condense steam within the reactor pressure vessel; and

extracting the heat from the cooling water outside of the containment structure at a rate which, within no more than about 3 hours, condenses sufficient steam in the reactor pressure vessel to lower ~~lowers~~ pressure in the reactor pressure vessel to a pressure at or below pressure in the containment structure resulting from the loss of coolant accident and thereby stopping or reversing the mass flow of reactor coolant from the reactor pressure vessel whereby the reactor core remains covered without the addition of water from other sources to the reactor pressure vessel.

Claim 22. (previously presented) The method of Claim 21 comprising the further steps of:

including at least one suppression tank containing water in the containment structure;

introducing steam in the containment structure resulting from the loss of coolant accident into the water in the at least one suppression tank to condense the steam; and

selectively transferring water from the at least one suppression tank to the reactor pressure vessel to keep the reactor core covered with water.

Claim 23. (original) The method of Claim 22 including mounting the at least one suppression tank above the reactor core and transferring the water to the reactor pressure vessel by gravity.

Claim 24. (currently amended) The method of Claim 23 further comprising:
disposing a lower portion of the reactor pressure vessel containing the reactor core in a flood-up cavity in the containment structure;

using gas in the at least one suppression tank above the water, which gas is compressed by the addition of a gas/ steam mixture from the pressurized containment structure to passively transfer at least some water in the at least one suppression tank to the flood-up cavity.

Claim 25. (original) The method of Claim 24 wherein the step of introducing the steam into the at least one suppression tank comprises introducing the gas/steam mixture from the containment structure at a level selected to transfer a first portion of the water in the at least one suppression tank to the flood-up cavity leaving a remaining portion of the water in the at least one suppression tank for selective transfer to the reactor pressure vessel by gravity.

Claim 26. (currently amended) The method of Claim 21 including disposing the lower portion of the reactor pressure vessel containing the reactor core in a flood-up cavity in the containment structure and including at least one suppression tank in the containment structure, introducing steam in the containment structure resulting from the loss coolant accident and gas in the containment structure into the water in the at least one suppression tank to condense the steam, and selectively using the gas in the at least one suppression tank, compressed during the condensing of steam by the gas added from the containment structure, to passively transfer water from the at least one suppression tank to the flood-up cavity.

Claim 27. (original) The method of Claim 26 further including constructing the containment structure from steel and directing a flow of a cooling fluid over an external surface of the containment structure to provide diverse cooling and depressurization of the containment structure whereby steam is condensed on the internal surface of the containment structure and returns to the reactor vessel flood-up cavity where it is available for cooling the reactor core.

Claim 28. (original) The method of Claim 21 including:
selectively venting steam from an upper portion of the reactor pressure vessel into the containment structure to ensure equalization of reactor pressure vessel pressure and containment structure pressure at a rate such that following a break in a lower portion of the reactor pressure vessel, reactor pressure vessel water level does not fall below the top of the reactor core.

Claim 29. (original) The method of Claim 21 including:

disposing a lower end of the reactor pressure vessel containing the reactor core in a flood-up cavity in the containment structure;

providing a supply of water in the containment structure to fill the flood-up cavity to a level above the top of the reactor core; and

selectively transferring water from the flood-up cavity to the reactor pressure vessel above the reactor core by gravity.

Claim 30. (currently amended) A method of operating a pressurized water reactor having a containment structure filled with a non-condensable gas and containing an integral reactor comprising at least one steam generator mounted together with a reactor core in a pool of reactor coolant in a reactor pressure vessel, the method comprising:

including at least one suppression tank containing water in the containment structure; and

in response to a loss of coolant accident, introducing the non-condensable gas in the containment structure together with steam in the containment structure resulting from the loss of coolant accident into the water in the at least one suppression tank to condense the steam and compress the non-condensable gas; and selectively transferring water from the at least one suppression tank to the reactor pressure vessel to keep the reactor core covered with water by reducing pressure in the reactor pressure vessel by removing heat directly from the reactor pressure vessel to outside the containment structure thereby lowering pressure in the containment structure and allowing the compressed non-condensable gas in the suppression tank to push the water from the suppression tank into the reactor pressure vessel.

Claim 31. (original) The method of Claim 30 wherein the step of including at least one suppression tank comprises mounting the at least one suppression tank within the containment structure above the reactor core, and the step of selectively transferring water comprises selectively transferring water from the at least one suppression tank to the reactor pressure vessel by gravity.

Claim 32. (currently amended) A method of operating a pressurized water reactor having a containment structure filled with a non-condensable gas and containing an integral reactor comprising at least one steam generator mounted together with a reactor core in a pool of reactor coolant in a reactor pressure vessel, the method comprising:

disposing a lower portion of the reactor pressure vessel containing the reactor core in a flood-up cavity in the containment structure;

including at least one suppression tank containing water in the containment structure; and

in response to a loss of coolant accident, introducing the non-condensable gas in the containment structure together with steam in the containment structure resulting from the loss of coolant accident into the water in the at least one suppression tank to condense the steam and compress the non-condensable gas; and selectively transferring water from the suppression tank to the flood-up cavity by reducing pressure in the reactor pressure vessel by removing heat directly from the reactor pressure vessel to outside the containment structure thereby lowering pressure in the containment structure and allowing the compressed non-condensable gas in the suppression tank to push the water from the suppression tank into the reactor pressure vessel.

Claim 33. (canceled)

Claim 34. (original) The method of Claim 32 including transferring some of the water in the at least one suppression tank into the reactor pressure vessel.

Claim 35. (original) The method of Claim 34 wherein the at least one suppression tank is mounted in the containment structure above the reactor core and some of the water in the at least one suppression tank is transferred into the reactor pressure vessel by gravity.

Claim 36. (currently amended) The method of Claim 35 wherein the non-condensable gas and steam from the containment structure are introduced into the water in the at least one suppression tank at a level in the at least one suppression tank to transfer a selected amount of the water to the flood-up cavity using the non-condensable gas compressed during the condensing of the steam in the at least one suppression tank and leaving a remaining amount of water in the at least one suppression tank for selective transfer by gravity to the reactor pressure vessel.